LAB 1

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Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

```
import java.util.*;


class Quad{

Scanner sc=new Scanner(System.in);

int a,b,c,d;

double r1,r2,d_sq;


void input(){

System.out.println("Enter coefficients a,b,c:");

a=sc.nextInt();

b=sc.nextInt();

c=sc.nextInt();

}


void calc(){

int d=b*b-4*a*c;

System.out.println(d);

if (d==0){

r1=-b/(2.0*a);

System.out.println("Roots are real and equal");

System.out.println("Root 1 = "+r1+"\nRoot 2 = "+r1);

}

else if(d>0){

d_sq=Math.sqrt(d);
```

```
r1=(-b+d_sq)/(2.0*a);
r2=(-b-d_sq)/(2.0*a);
System.out.println("Roots are real and distinct");
System.out.println("Root 1 = "+r1+"\nRoot 2 = "+r2);
}
else{
d_sq=Math.sqrt(-d);
r1=-b/(2.0*a);
r2=d_sq/(2.0*a);
System.out.println("Roots are imaginary");
System.out.println("Root 1 = "+r1+" + "+r2+"i"+"\nRoot 2 = "+r1+" - "+r2+"i");
}
}
}

class Quadratic{
public static void main(String[] args){
System.out.println("Name: Abhinav Sanjay \nUSN: 1BM23CS009");
Quad quad=new Quad();
quad.input();
quad.calc();
}
}
```

Output

```
D:\Abhinav3A\Java>java Quadratic
Name: Abhinav Sanjay
USN: 1BM23CS009
Enter coefficients a,b,c:
1
5
6
1
Roots are real and distinct
Root 1 = -2.0
Root 2 = -3.0

D:\Abhinav3A\Java>java Quadratic
Name: Abhinav Sanjay
USN: 1BM23CS009
Enter coefficients a,b,c:
1
1
1
-3
Roots are imaginary
Root 1 = -0.5 + 0.8660254037844386i
Root 2 = -0.5 - 0.8660254037844386i

D:\Abhinav3A\Java>java Quadratic
Name: Abhinav Sanjay
USN: 1BM23CS009
Enter coefficients a,b,c:
4
12
9
0
Roots are real and equal
Root 1 = -1.5
Root 2 = -1.5

D:\Abhinav3A\Java>
```